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Leucistic Marbled Salamanders (*Ambystoma opacum*) in Virginia

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Albinism and its various forms have been reported for a variety of species and life history stages of North American amphibians (Hensley, 1959; Brame, 1962; Dyrkacz, 1981; Bechtel, 1995). Most instances of albinism are based on single individuals in populations that otherwise contain normally pigmented individuals. Examples from Virginia include American Toad (*Bufo americanus*) from Fairfax County, Upland Chorus Frog (*Pseudacris feriarum*) from Frederick County, Eastern Spadefoot (*Scaphiopus holbrookii*) from New Kent County, Northern Gray-cheeked Salamander (*Plethodon montanus*; originally reported as *P. jordani*) from Smyth County, and Peaks of Otter Salamander (*Plethodon hubrichti*) from Botetourt County (Hensley, 1959; Bulmer, 1975; Hayslett et al., 1998). In some cases, however, numerous albinistic individuals are reported for a single population. An increase in frequency of albinism in the Shovel-nosed Salamander (*Desmognathus marmoratus*) was reported for a population in North Carolina studied over a six-year period by Martof (1962) and Martof & Walton (1965). Albinism or its more common leucistic form (lacking integumentary pigment with normal eyes; Dyrkacz, 1981) has been reported for the five species of amphibians in Virginia noted above. None of the reports, however, suggest more than single occurrences within populations.

Albinism is known to occur in 8 of the 14 recognized species of salamanders in the genus *Ambystoma* (exclusive of the unisexual forms) throughout North America (Dyrkacz, 1981; Petranka, 1998). In the mid-Atlantic region, reports of albinistic ambystomatids include larval Jefferson Salamanders (*A. jeffersonianum*), an adult Spotted Salamander (*A. maculatum*), and larval Marbled Salamanders (*A. opacum*) in Maryland (Harris, 1967, 1968, 1970), and larval Mole Salamanders (*A. talpoideum*) from North Carolina (Palmer & Braswell, 1980). Dodd (1977-78) illustrated a leucistic Marbled Salamander larva but provided no locality data. No occurrences of albinism have been reported for mole salamanders in Virginia. The purpose of this note is to report two instances of the leucistic phase of albinism in *Ambystoma opacum* from the upper Coastal Plain of Virginia and the Shenandoah Valley.

On 22 April 1998, a leucistic *Ambystoma opacum* larva was collected with a dip net in a small, vegetated, vernal pool (formerly a road rut) on Fort A.P. Hill Military Reservation, Caroline County, Virginia (Fig. 1). It completely lacked dark pigment on the body and tail but had normally colored (dark) eyes. The gills were pink. Measurements of this larva were 27 mm snout-vent length (SVL), 49 mm total length, and 0.86 g. A sample of normally pigmented larvae caught in the same pool on the same day averaged ($\pm$ 1 SD) 30.6 $\pm$ 1.5 mm SVL (27-35, n = 36), 55.0 $\pm$ 3.3 mm total length (50-61, n = 31), and 1.3 $\pm$ 0.2 g (0.98-1.64, n = 36). The leucistic larva was smaller than the rest of the cohort in all respects. It was kept alive for photographs but subsequently lost. Other aquatic amphibians found on the same date in the pool were Spotted Salamander larvae, Red-spotted Newt (*Notophthalmus viridescens*) adults, and Green Frog (*Rana clamitans*) tadpoles; all had normal pigmentation.

On 14 June 2002, a leucistic *Ambystoma opacum* metamorph was captured in a pitfall trap leaving Pond 2 in the Maple Flats Pond Complex within the Shenandoah Valley Sinkhole Pond system of the Big

Levels area in the George Washington National Forest of southeastern Augusta County, Virginia (see Buhlmann et al., 1999). This animal lacked dark pigment on the body and had only a narrow line of dark pigment on the dorsal ridge of the tail (Fig. 2). The eyes and gill stubs were dark. The leucistic metamorph measured 39 mm SVL and 69 mm TL and weighed 1.56 g. Twelve normal metamorphs captured in the same pitfall on this date averaged 42.6 ± 1.2 mm SVL (38-45), 71.9 ± 2.1 mm TL (62-76), and 1.71 ± 0.2 g (1.56-2.94). Other amphibians found in Pond 2 during June 2002 included Spring Peeper (*Pseudacris crucifer*) larvae and a few adult Red-spotted Newts. No other ambystomatids bred in Pond 2 in the 2001-02 season. The leucistic salamander was released.

We examined over 4,279 larvae (789 in Caroline County, 3,490 in the Shenandoah Valley) and 12,167 metamorphs (Shenandoah Valley) of *Ambystoma opacum* from these two locations during 1997-2002. All but these two individuals exhibited the normal pigmented phenotype. Genetically-based albinism and other pigment abnormalities occur naturally but rarely in most vertebrates, including humans. Our observations and literature review suggest that the leucistic form of albinism occurs rarely in *A. opacum* populations. The two reported here provide the first documentation of leucistic marbled salamanders in Virginia.

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Fig. 1. Leucistic and normal *Ambystoma opacum* larvae from Fort A.P. Hill, Caroline County, Virginia.

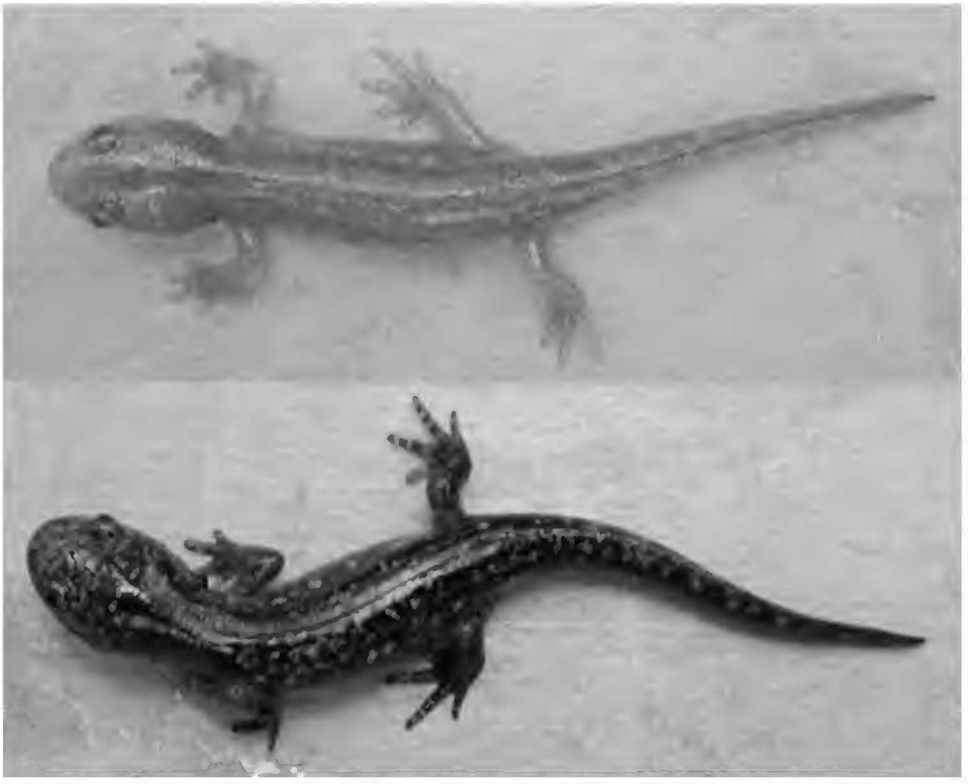

Fig. 2. Leucistic and normal *Ambystoma opacum* metamorphs from the Shenandoah Valley sinkhole ponds, Augusta County, Virginia.

Shorter Contributions

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COPPERHEAD PREYS ON STAR-NOSED MOLE IN THE GREAT DISMAL SWAMP -- On 19 May 1989, I photographed an adult Copperhead (*Agkistrodon contortrix*; total length, 0.9-1.0 m) as it swallowed a Star-nosed Mole (*Condylura cristata*) on the graveled shoulder of Jericho Ditch Lane (36° 42.98' N, 76° 32.11' W), 2.7 km east of White Marsh Road, in the Great Dismal Swamp National Wildlife Refuge, City of Suffolk, Virginia (Fig. 1). Both species are believed to be relatively common in the Great Dismal Swamp (Handley, 1979; Mitchell et al., 2000). Habitat on either side of the elevated roadbed consisted of seasonally flooded, second-growth forest dominated by red maple (*Acer rubrum*) and swamp black gum (*Nyssa sylvatica* var. *biflora*) (Graves, 2001).

To my knowledge, the present observation represents the second record of snake predation on the Star-nosed Mole (Petersen & Yates, 1980; Mitchell, 1994). Copperheads prey on a wide variety of small mammals including the Eastern Mole (*Scalopus aquaticus*) and Hairy-tailed Mole (*Parascalops breweri*) (Conant, 1938; Uhler et al., 1939; Fitch, 1960; Gloyd & Conant, 1990), and it probably feeds on the star-nosed mole wherever the two species co-occur.

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Fig. 1. Copperhead preying on Star-nosed Mole in the Great Dismal Swamp.

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